The Nuclear Workforce Challenge

K. L. Peddicord, Director
Nuclear Power Institute, Texas A&M University, USA

ATR National Scientific User Facility
Idaho Falls, ID

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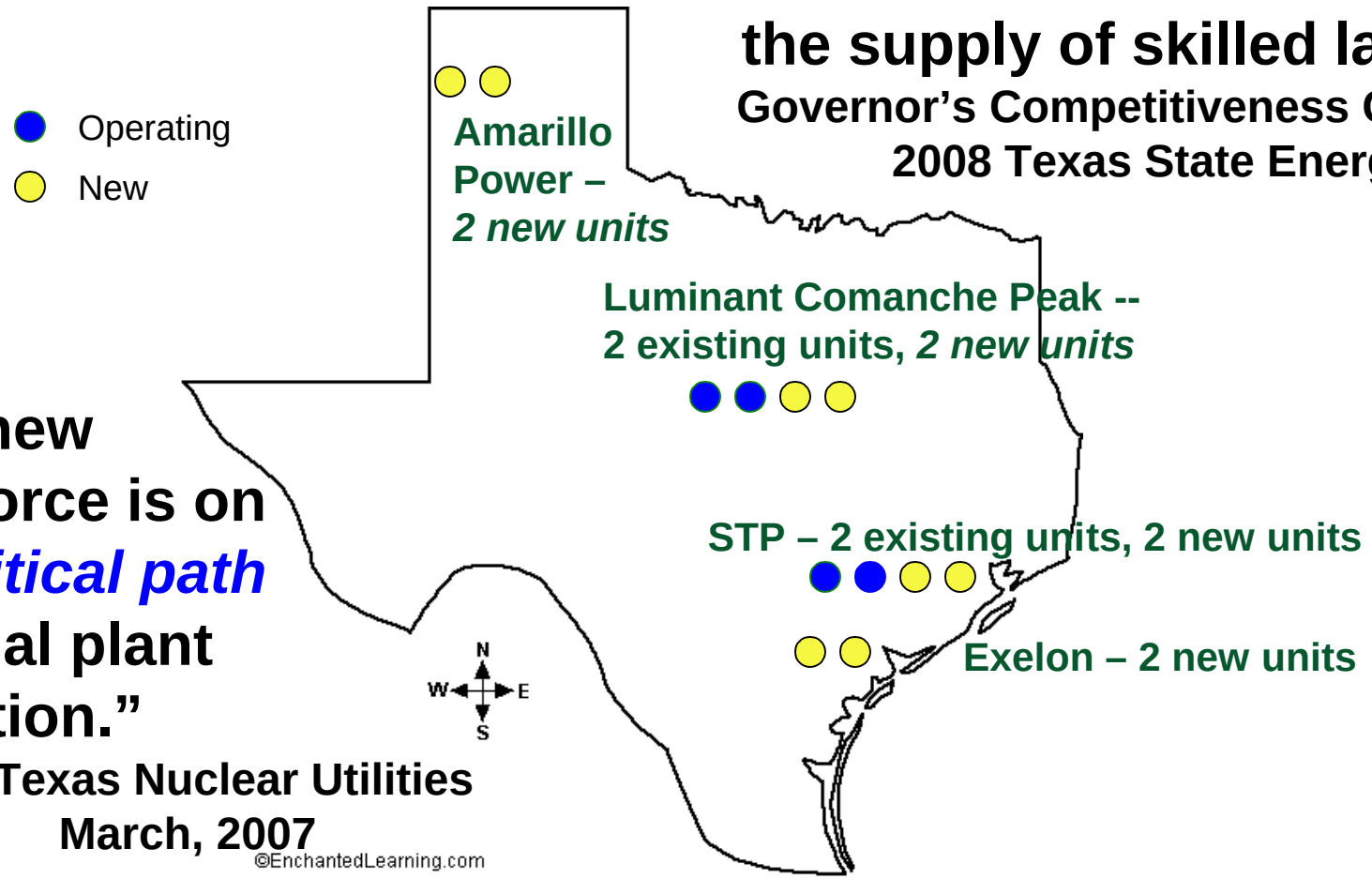
Nuclear Power Plants in Texas

Four plants in operation
Eight new plants planned

"Based on the analysis, occupations in Nuclear and Renewables…far outpace the supply of skilled labor."
Governor's Competitiveness Council
2008 Texas State Energy Plan



"The new workforce is on the *critical path* to initial plant operation."

The Texas Nuclear Utilities
March, 2007

A Plan and Roadmap for the Entire Plant Workforce

Texas Nuclear Workforce Development Initiative

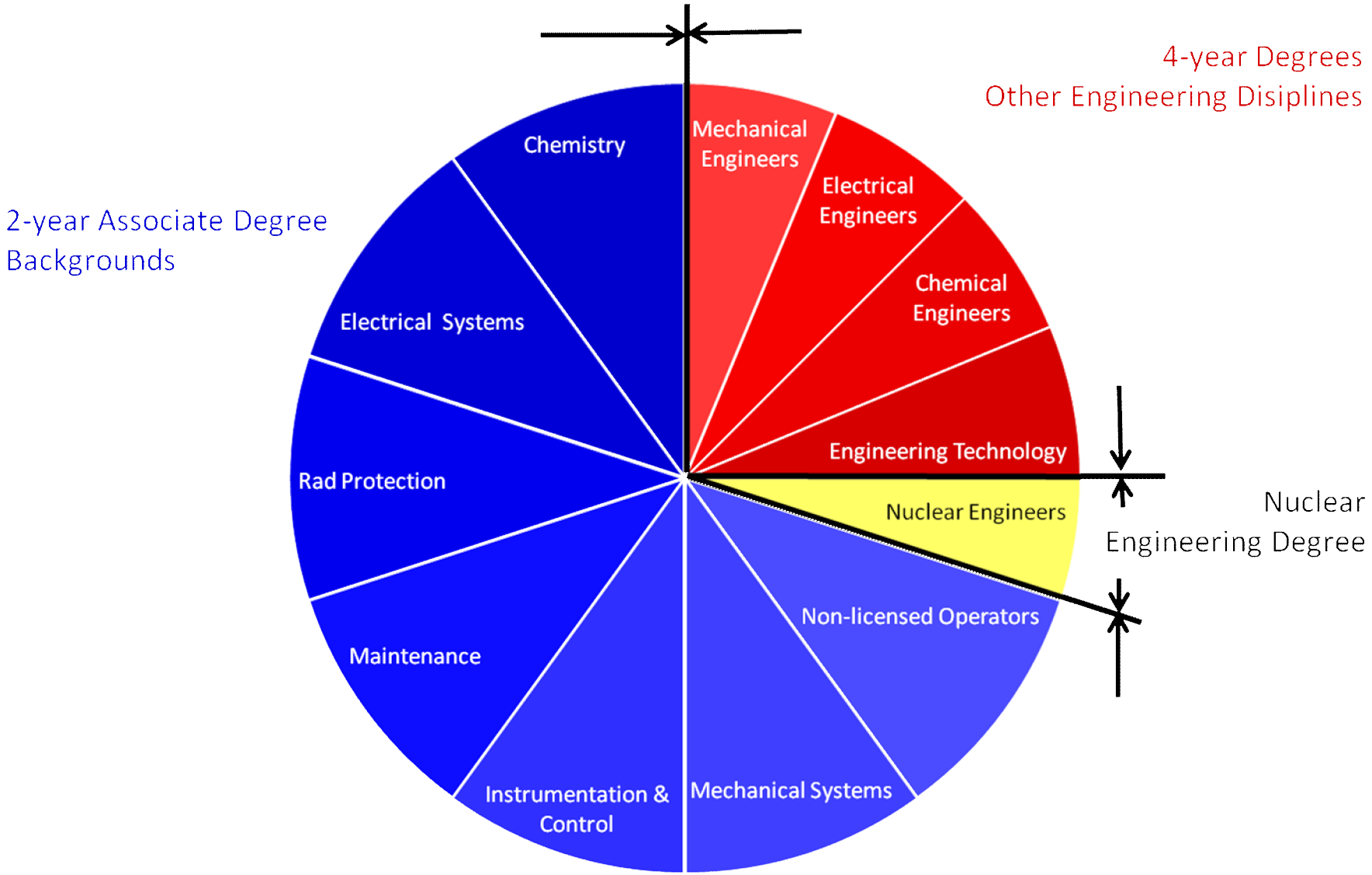
April 23, 2007

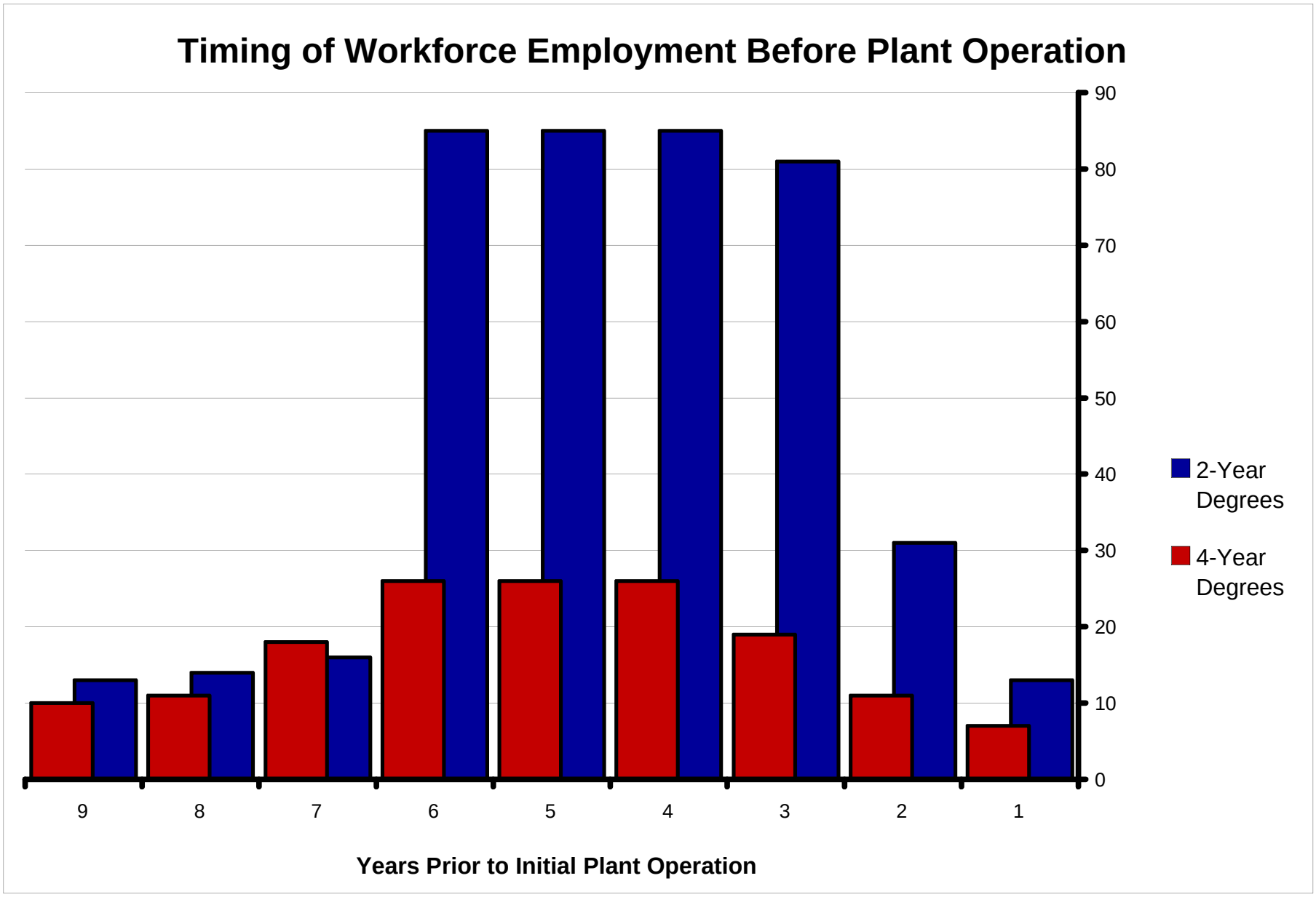
I. Overview

Several studies indicate that there will be significant increases in demand for skilled utility workers and that supply of these workers will not keep pace with this anticipated growth. With the potential for new nuclear power plants in Texas, coupled with aging workforces at our existing nuclear power plant (NPP) facilities, extraordinary actions will be necessary to provide the qualified workforce requirements for this decade and next. This anticipated shortage of skilled utility workers is a key challenge for the Texas energy industry…

("White Paper" authored by the Texas nuclear utilities, contained 11 specific targeted areas)

Example Distribution of Disciplines for the Nuclear Workforce




Timing of Workforce Employment Before Plant Operation
90
80
70
60
50
40
30
20
10
0
9
8
7
6
5
4
3
2
1
2-Year Degrees
4-Year Degrees
Years Prior to Initial Plant Operation

Utility Desires

- Inform students of career opportunities
- Attract them to the various academic options
- Create programs that satisfy some of the “ACAD’s” of the National Academy of Nuclear Training of the Institute of Nuclear Power Operations
- Satisfy some of the training requirements, accelerate training programs

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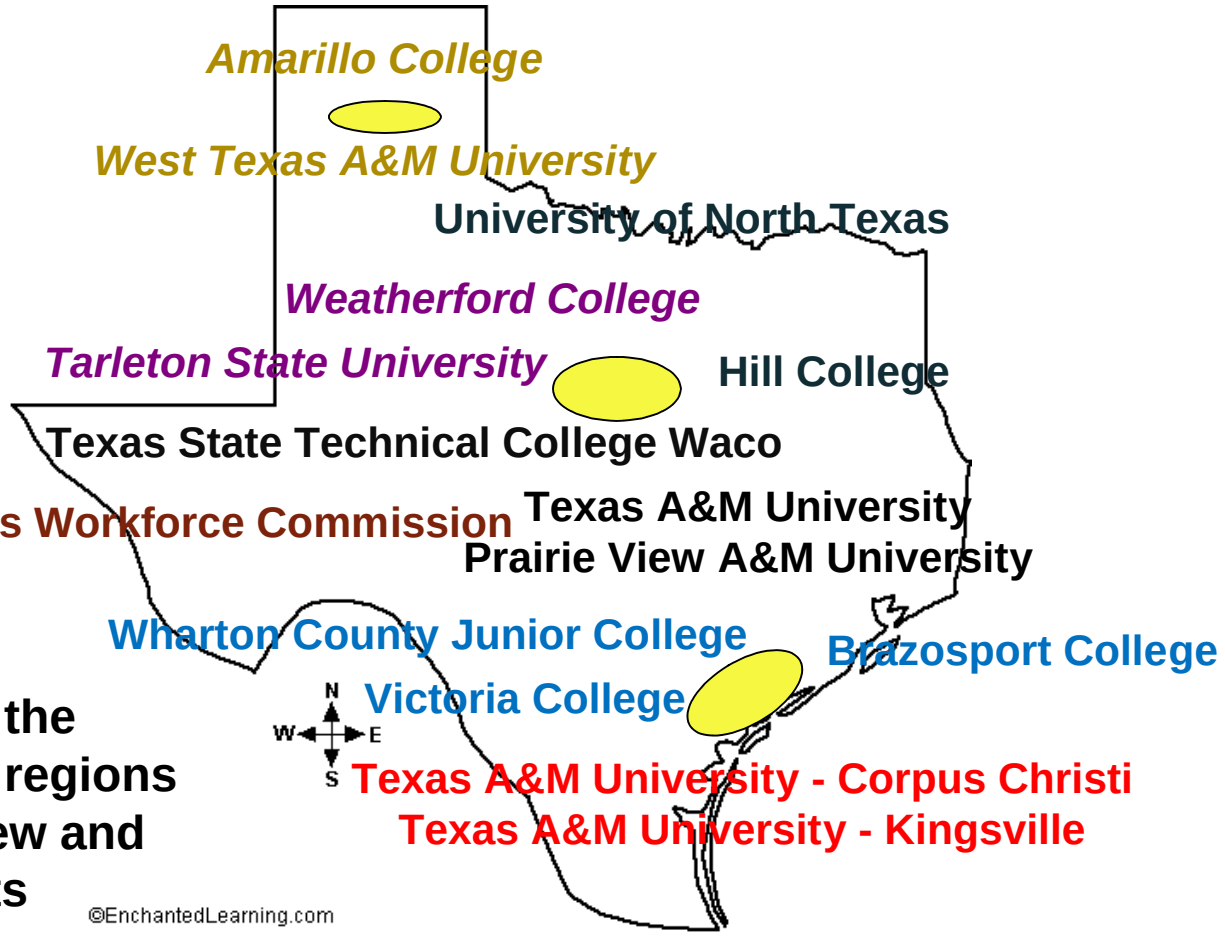
Department of Nuclear Engineering
Texas A&M University

- Largest nuclear engineering department in the U.S.
- 257 undergraduates, 94 grad students, 24 faculty members (Fall, 2008)
- Only campus in the country with *two* reactors
- Collaboration with universities in *France, Russia, China, India and Mexico*
- Producing graduates at *every level* and for *every facet* of the nuclear enterprise

Comprehensive Response:
Nuclear Power Institute Partnership



Emphasis on the geographical regions around the new and existing plants

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- Focus on the full breadth of the workforce needs for nuclear power plants
  - ~450/plant, 70% at 2-yr associate degree level for plant technicians
  - BS in ME, EE, ChE and Engr Tech with a nuclear power focus
- Outreach to high schools, teachers and students about nuclear power careers to attract students to these programs

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Developing the Nuclear Workforce

Jr High

Elem

Promo-tion of STEM Prgms

Pre-College Engagement

- Close and vigorous interactions with high schools
- Strong links with teachers (RET)
- Student programs (POWER SET)

2 Year CC

- Nuclear Power Technology Assoc Degree
- Nuclear Power Tech Adv Cert
- Operations, Maintenance, Rad Protection, Digital I&C

4 Year Univ

- Nucl Engr
- Engr Tech/ Power Engr (Nuclear)
- ME, ChE, EE/ Nucl Power Cert
- Multi-disc Teams
- Reactor operator preparation

Utilities

- Training/ Careers
- HS Visits/ Recruiting
- Scholarships
- Participate in Curric/Course Development
- Participate in Engagement with State Leadership/ Key Decision Makers

NPI Role:

- Strategic Planning
- Leadership/Management/ Coordination with partners
- Program Development
- Visibility and Recognition

NPI Community College Partners

New Programs

Radiation Protection
Digital Instrumentation and Control

Associate of Science degree in Nuclear Power Technology

Advanced Certificate in Nuclear Power Technology

Nuclear Power Technology Program
Wharton County Junior College

- Curriculum developed with industry
- Approved 2-year degree
- Courses to meet utility needs
  - Math & Chem Fundamentals for Nuclear Power
  - Nuclear Fundamentals I & II
  - Nuclear Power Plant Org & Processes
  - Nuclear Power Plant Systems I & II
- First cohort, 124 applicants,
  73 students accepted
  and enrolled, STP
  created an "Educational
  Incentive Program"

An Excellent

"Best Practice"!

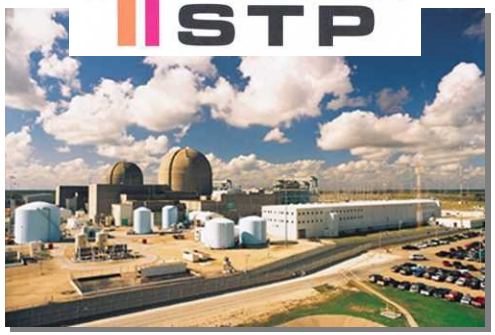
Center for Energy Development

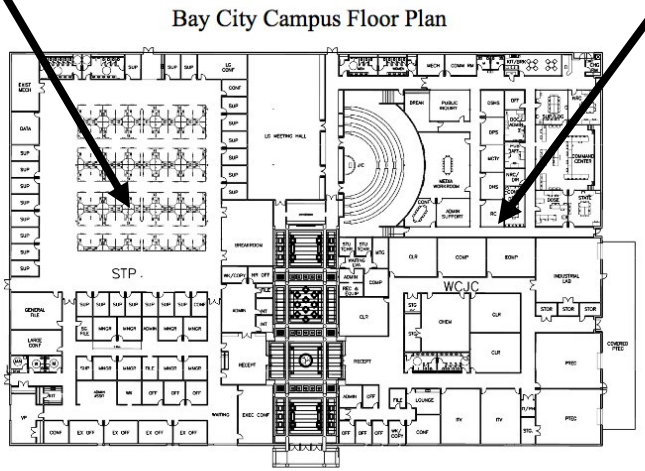
Bay City, Texas

STP Units 3 & 4
Engineering Staff

…co-located with the…

WCJC
Nucl Power Tech Prgrm





Involving the Stakeholders

Nuclear Power Institute Advisory Council

Outreach

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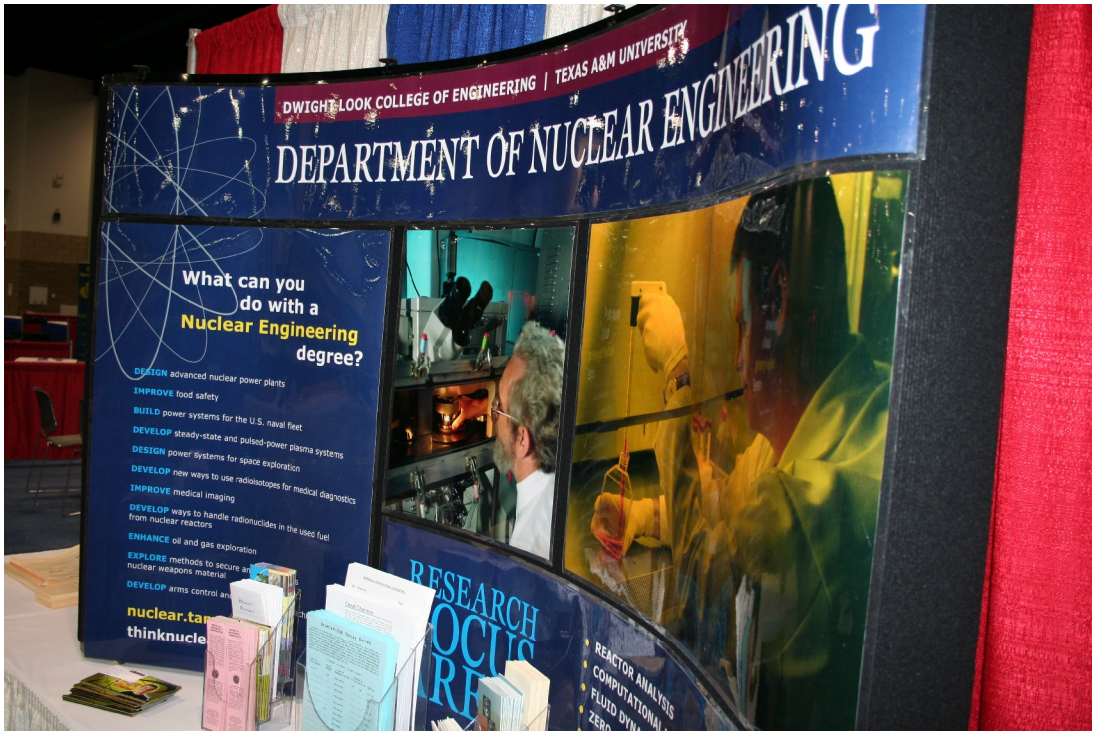
A key element is outreach to students and teachers to inform them of the opportunities and careers in nuclear technology



- 27 visits in 2008 to high schools, college nights and career fairs

- Interaction with over 3500 high students

- Visits to the A&M Nuclear Science Center by 3000+ students

Exceptional Careers Opportunities for Students

- Strong background allows graduates to move directly into utility training programs
- Careers are:
  - Attractive, high tech
  - high paying (starting salaries $55,000 to $65,000 per year),
  - Long lasting (50 years+), and good stability
  - Good opportunities for advancement
  - Close to home and family
  - In an industry identified as key to the future of Texas

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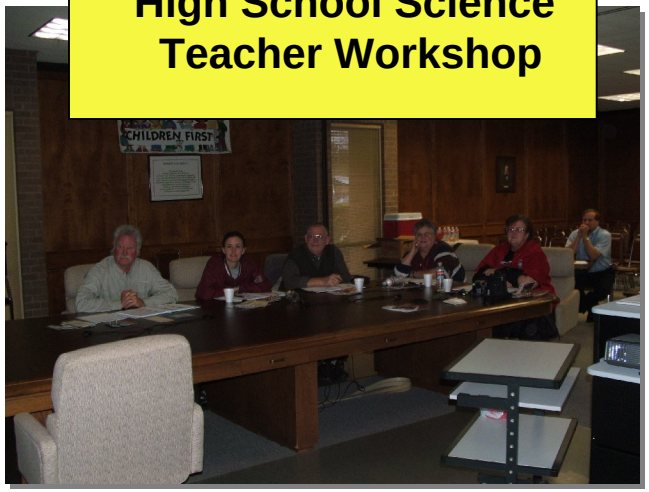
Outreach to Teachers

South Texas Chapter Health Physics Society High School Science Teacher Workshop



Interaction of Radiation with Matter
Health and Dose Effects

Conference for the Advancement of Science Teaching (CAST)

- 6000 high school science teachers
- 1100 information packets distributed on nuclear technology

Innovative Approaches-Teachers

Research Experience for Teachers (RET)

Enrichment Experiences in Engineering-E³

Five teachers from Matagorda County
4 weeks at A&M, 2 weeks at STP
working on nuclear projects

RET Teachers with Faculty Mentors at A&M

Dressed out in "canary suits" at STP

Innovative Approaches-Students

POWER SET

P*owerful* ***O****pportunities for* ***W****omen*
E*ager and* ***R****eady for* ***S****cience,*
E*ngineering and* ***T****echnology*

Palacios High School

…to A&M

POWER SET and their WIN Mentors

POWER SET Field Trips…

Mentoring younger students 4th, 5th & 6th graders

…to STP

Valeria Segovia, Principal, Palacios High School

A Vibrant, Robust Partnership with All the Key Participants

- *Working with industry* to build the needed new programs
- Bringing together the *2-yr and 4-yr institutions*
- Informing and involving *civic and elected leaders*
- Developing an effective *outreach and recruiting* program
- Responding to this key workforce challenge

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